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(21) International Application Number: PCT/EP93/02882 (22) International Filing Date: 19 October 1993 (19.10.93) (30) Priority data: 92203356.8 2 November 1992 (02.11.92) EP <i>(34) Countries for which the regional or international application was filed:</i> AT et al. (71) Applicant (for all designated States except US): QUEST INTERNATIONAL B.V. [NL/NL]; Huizerstraatweg 28, NL-1411 GP Naarden (NL). (72) Inventors; and (75) Inventors/Applicants (for US only): BURGER, Jacobus, Johannes [NL/NL]; Leerdamhof 349, NL-1108 CD Amsterdam (NL). RENES, Harrie [NL/NL]; Rivierahof 21, NL-1394 DB Nederhorst den Berg (NL). SLOOT, Edibertus, Albertus [NL/NL]; Simon Stevinweg 92, NL-1222 ST Hilversum (NL).		(74) Agent: DEKKER, Enno, E., J.; Unilever N.V., Patent Division, P.O. Box 137, NL-3130 AC Vlaardingen (NL). (81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, US, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: TOBACCO MATERIAL CONTAINING MICRO-ORGANISM CELLS (57) Abstract The invention relates to tobacco material wherein micro-organism cells have been incorporated. Preferably the incorporated micro-organism cells comprise a flavour and/or flavour component encapsulated therein. The micro-organism cells can be those of yeast, fungi, algae or bacteria which are suitable for human consumption. Preferably the micro-organism cells have a flavour and/or flavour component content from 5 to 70 %.		

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Tobacco material containing micro-organism cells.

The invention relates to improved tobacco material, more in particular to tobacco material with improved flavour properties.

Under tobacco material is here to be understood leaves, stems, other parts of the tobacco plant and also includes so-called reconstituted leaf or reconstituted tobacco obtained from finely divided (waste) tobacco plant material and processing this, optionally together with cellulosic material to form reconstituted leaf or sheet material. The term further comprises other materials which are consumed together with the tobacco e.g. cigarette paper and adhesive material for cigarette paper. The term finally comprises any alternative to tobacco products proposed for reasons of scarcity or for health reasons.

The flavouring of tobacco material for various purposes has been known for a long time and reference is made in this connection to Tobacco (Tropical Agriculture Series), by B.C. Lakehurst, Longman Publ., London 1968, in particular pages 471-474 are worthwhile. Tobacco products are mostly flavoured before they are processed into cigarettes or other tobacco products. The most important prior art method of flavouring of tobacco material is spraying or atomizing a liquid flavour, sometimes diluted with an organic solvent e.g. alcohol over the bulk of the tobacco. One of the main disadvantages of this method is that the flavour is being finely dispersed over a great surface area, thus evaporates easily and is susceptible to oxidative deterioration. Consequently the effect if flavouring may be short lived. Flavouring with menthol has been quite popular for a long time. Menthol, however, tends to evaporate from cigarettes

upon storage and menthol flavoured cigarettes thereby rapidly lose their attraction. There are various other reasons why the flavour of certain tobacco products deteriorates upon storage.

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It has been proposed to solve this problem by using airtight packaging filled with an inert gas (cf German Offenlegungsschrift DE-A-30 06 092). This is, however, an expensive alternative and the problem reappears as soon as
10 the customer opens the package. Flavour properties are an important feature of tobacco products and in particular the following aspects of flavouring require attention:

- retention of flavours during storage
- improvement of flavour stability
- 15 controlled flavour delivery during smoking
- improvement of side stream e.g. room smell
- improvement of reconstituted leaf (neutralization of off-taste)

Flavoured tobacco products known in the art so far suffered
20 from disadvantages in one or more of the flavour aspects outlined above and improvement is required.

The present invention now provides tobacco materials with improved flavouring properties by incorporating micro-
25 organism cells in this material.

Especially the room smell of cigarettes and cigars with reconstituted tobacco containing with such micro-organism cells was found to be improved. Incorporation of the micro-
30 organism cells in tobacco can be effected by spraying or atomizing a suspension of the micro-organism cells, e.g. in water or a tobacco humectant, on the tobacco material through a nozzle or atomizer in a mixing chamber or mixing vessel, optionally followed by re-drying of the material.

Conical mixers are very suitable. For efficient spraying or atomizing a suspension of low viscosity is recommended. Further details of this technique can be found in "Tobacco" cited above in particular pp. 473-474. Preferred are dead
5 micro-organism cells. Also the micro-organism cells may die as a result of the process of applying them to the tobacco or the treatment they undergo before the application.

Tobacco material usually contains 15 - 18% by weight of
10 water depending on the nature of the tobacco and the treatment it has been subjected to. Usually the amount of water or humectant sprayed on as the suspension increases the moisture content of the tobacco material with at most 5% by weight and any excess can be removed by drying with
15 air or inert gas to a suitable level. Care must, however, be taken that the drying temperature is not too high to affect the tobacco material.

Suitable humectants/solvents should not themselves have an
20 annoying odour or flavour and should be allowed for use in tobacco. Suitable are e.g. ethanol, isopropanol, propylene glycol, glycerol and benzylalcohol.

In a preferred embodiment of the invention tobacco material
25 is provided wherein the incorporated micro-organism cells comprise a flavour and/or flavour component encapsulated therein. The technique of encapsulating a flavour and/or flavour component (including flavour precursors) in micro-organism cells has been disclosed in EP-A-0 085 805 and
30 EP-A-0 242 105, especially in the latter.

Preferably the micro-organism cells are those of yeast, fungi, algae or bacteria which are suitable for human consumption. Especially the use of yeast encapsulated

flavours in cigarettes was found to be a clear improvement. Also the use of such encapsulated flavour in wet snuff yielded a positive flavour effect. A preferred micro-organism which can be used is food grade yeast such as
5 *Saccharomyces cerevisiae*.

In a preferred embodiment of the invention the micro-organism cells have a flavour and/or flavour component content from 5 to 70%, preferably from 10 to 50% by weight.
10

It is especially useful to improve tobacco material by incorporating micro-organism cells, preferably those having a flavour incorporated therein, in reconstituted tobacco or in paper or adhesive for use in tobacco products.

15 Although many different flavours and/or flavour components can be added to tobacco according to the invention, particularly useful are those of the group consisting of peppermint oil, menthol, menthone, menthyl alcohol, clove,
20 sandalwood, vanillin, rose oil and geranium oil. The latter two are especially important for wet snuff.

In the case of flavouring with peppermint oil, menthol, menthone or menthyl alcohol the tobacco material to be
25 flavoured is preferably tobacco material for cigarettes.

The invention also provides a process for the production of tobacco material with improved flavour properties wherein flavour encapsulated in micro-organism cells is sprayed as
30 a suspension on tobacco material.

The invention is now illustrated by the following examples:

Example 1.

Menthol was encapsulated in brewers yeast according to Example XI of EP-A-0 242 135 and the amount of menthol in the yeast was approximately 25% w/w. The dosage of filled yeast cells was about 4 parts on 1000 parts by weight of tobacco. Upon storage a considerable retention of menthol flavour was obtained as was evident from comparative smoking sessions.

10

Example 2.

Clove oil was encapsulated in brewers yeast according to Example II of EP-A-0 242 135 and the amount of clove oil in the yeast cells was approximately 30% w/w. The dosage of filled yeast cells was about 3 parts per 1000 parts by weight of tobacco for kretek cigarettes. A controlled delivery of flavour was noted upon smoking.

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Example 3.

Blank brewers yeast was used in this example which was applied to reconstituted tobacco in an amount of 5% w.w. The room smell of the reconstituted tobacco was improved.

Example 4.

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Orange flavour was encapsulated in brewers yeast according to Example XVII of EP-A-0 242 135, however, using commercially available orange oil instead of lemon oil. The dosage of filled yeast cells was about 1 part per 700 parts

by weight of wet snuff. A controlled delivery and retention of flavour was noted.

5 Example 5.

5 g of brewers yeast was suspended in 15 g of tap water of 40°C. To the slurry thus obtained 3.5 g of East Indian sandalwood oil were added, followed by stirring during 4
10 hours. After cooling to room temperature the flavour filled yeast cells were isolated by centrifuging and spray dried. The oil content of the cells was 70% by weight. When the dry cells were crushed a distinct odour of sandalwood oil was noticed. The dosage of filled yeast cells applied to
15 cigarette paper by spraying was about 1 part per 1000 parts by weight. When used in cigarettes an improved room smell was noted.

Claims

- 5 1. Tobacco material wherein micro-organism cells have been incorporated.
2. Tobacco material according to claim 1, wherein the incorporated micro-organism cells comprise a flavour
10 and/or flavour component encapsulated therein.
3. Tobacco material according to claim 2, wherein the micro-organism cells are those of yeast, fungi, algae or bacteria which are suitable for human consumption.
15
4. Tobacco material according to claim 1, 2 or 3, wherein the micro-organism cells are of food grade yeast.
5. Tobacco material according to any of the preceding
20 claims, wherein the micro-organism cells have a flavour and/or flavour component content from 5 to 70%, preferably from 10 to 50% by weight.
6. Tobacco material according to any of the preceding
25 claims, wherein the micro-organism cells have been incorporated in reconstituted tobacco material.
7. Tobacco material according to any of the preceding
30 claims, wherein the micro-organism cells have been incorporated in paper or adhesive for use in tobacco products.
8. Tobacco material according to any of the preceding claims, wherein the flavour encapsulated is a flavour

consisting of the group consisting of peppermint oil, menthol, menthone, menthyl alcohol, clove, sandalwood and vanillin.

- 5 9. Tobacco material according to any of the preceding
 claims, wherein the tobacco material is tobacco
 material for cigarettes.
- 10 10. Process for the production of tobacco material with
 improved flavour properties wherein flavour
 encapsulated in micro-organism cells is sprayed as a
 suspension on tobacco material.
- 15 11. Tobacco products comprising tobacco material according
 to any one of claims 1-9

INTERNATIONAL SEARCH REPORT

Int. Application No
PCT/EP 93/02882

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 A24B15/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 5 A24B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE WPI Section Ch, Week 7626, 1976 Derwent Publications Ltd., London, GB; Class D18, AN 76-49109X & JP,A,51 054 996 (KANEGAFUCHI CHEM.) 15 May 1976 see abstract	1,4,6,9, 11
A	EP,A,0 242 135 (AS2 LTD) 21 October 1987 cited in the application see the whole document	1-11
A	FR,A,2 138 951 (IMPERIAL TOBACCO GROUP LTD) 5 January 1973 see the whole document	1-11

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. Application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0242135	21-10-87	CA-A- 1301682	26-05-92
FR-A-2138951	05-01-73	AU-A- 4157272	01-11-73
		BE-A- 783560	18-09-72
		CA-A- 946243	30-04-74
		CH-A- 570127	15-12-75
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